



**Alabama State Buildings Energy Conservation Initiative**

**Executive Order Number 25 Report**

**May 31, 2013**

**Prepared for:**

**Governor Robert Bentley**

**Prepared by:**

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OFFICE OF THE GOVERNOR

**ROBERT BENTLEY**  
GOVERNOR



ALABAMA DEPARTMENT OF ECONOMIC  
AND COMMUNITY AFFAIRS

**JIM BYARD, JR.**  
DIRECTOR

**STATE OF ALABAMA**

**May 31, 2013**

The Honorable Robert Bentley  
Governor of Alabama  
State Capitol  
Montgomery, Alabama 36130

Dear Governor Bentley:

I am pleased to issue our first report for the Alabama State Buildings Energy Conservation Initiative. We appreciate your signing Executive Order Number 25, requiring state departments and agencies to reduce their energy consumption by thirty percent (30%) by Fiscal Year 2015 relative to Fiscal Year 2005.

As a result of this Executive Order, state departments and agencies saved \$3,240,170 during Fiscal Year 2012. In addition, two Universities and one Institution saved \$659,241, saving the state a total of \$3,899,411.

ADECA is committed to ensuring the goals of your Executive Order are carried out.

Sincerely,

  
Jim Byard, Jr.  
Director

JB/TLA/sf

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## **Introduction**

Executive Order Number 25 (EO 25) was signed November 15, 2011, and issued December 28, 2011 by Governor Robert Bentley. All state departments and agencies shall reduce energy consumption by Fiscal Year 2015, as the state works to implement energy-efficient practices and reduce wasteful and inefficient uses of energy. Under EO 25, all state agencies and departments are to designate an Energy Officer to study, investigate and recommend energy saving procedures and practices for their agency. Agencies must reduce energy consumption by 30 percent by 2015, relative to 2005 levels.

EO 25 was a continuation of the State's Energy Efficiency Program that began in 2006 with Executive Order Number 33 (EO 33). EO 33 required all state agencies and departments to reduce energy consumption by 10 percent in state-owned and operated buildings by Oct. 1, 2008, and 20 percent by Oct. 1, 2010, relative to Fiscal Year 2005 levels. Agencies meeting or exceeding the EO 33 2010 goal of 20 percent reduction in energy consumption were Alabama Forestry Commission, Military Department, Agriculture and Industries, and Alabama Emergency Management Agency.

EO 25 also requires all state departments to use the U.S. Environmental Protection Agency's (EPA) ENERGY STAR Portfolio Manager Program for benchmarking. It also created an increase in the need for training as agency participation increased from the appointment of new Energy Officers.

## **Program Performance Summary**

There are 20 State agencies utilizing EPA's ENERGY STAR Portfolio Manager with 634 facilities. Included is Postsecondary Education (Alabama Community College System [ACCS]) with 25 campuses and 385 facilities, two Universities and one Institution with 76 facilities. The following chart reflects agencies reporting percent change from the Base Year of 2005, and the reductions towards meeting the EO 25 goal of a 30 percent reduction in energy consumption by FY 2015. During FY 2012, State agencies saved an estimated \$3,240,170, the two Universities saved \$285,910, and the Institution saved \$373,331, for a total of \$3,899,411 in annual energy savings.

**The following represents Energy Data submitted for FY 2012**

Reporting Agencies		----- FY 2012 -----		
AGENCY/Institution NAME	Total Floor Space (Sq. Ft.)	Annual Energy Cost	% Chg from Base Year	2012 Est. Cost Saved/Avoided
ABC Board Central Office Hqs & Warehouse	174,610	\$157,892	-6.0	-\$18,559
Corrections Department	2,980,363	\$7,490,874	-16.1	-\$1,571,222
Emergency Management Agency	35,000	\$111,785	-39.5	-\$79,848
Environmental Management	195,222	\$475,408	-18.7	-\$187,063
Finance Department	1,833,076	\$3,482,424	-7.0	-\$184,630
Forestry Commission	29,936	\$38,666	-28.1	-\$19,290
Geological Survey/Oil and Gas Board	95,967	\$105,047	-7.1	-\$6,984
Military Department (State Operated Facilities)	1,213,229	\$1,252,892	-23.3	-\$380,209
Pardons and Paroles	73,517	\$228,924	-2.2	-\$3,769
Postsecondary Education (ACCS)	6,865,103	\$12,041,594	N/A	-\$754,884
Public Health	1,168,527	\$2,335,719	8.6	N/A
Real Estate Commission	16,681	\$54,978	15.0	N/A
Supreme Court	265,017	\$518,924	-5.0	-\$33,712
Transportation Department	1,221,323	\$2,002,986	20.8	N/A
Alabama Institute for Deaf & Blind	536,258	\$362,079	-9.6	-\$373,331
Athens State University	393,817	\$508,955	-19.6	-\$33,064
University of Montevallo	1,062,634	\$1,336,963	-20.0	-\$252,846
<b>TOTALS FY 2012:</b>	<b>18,160,280</b>	<b>\$32,506,111</b>		<b>-\$3,899,411</b>

**Notes:**

1. Current Energy Period Ending Date is the last 12 months of complete utility data in Portfolio Manager.
2. Base Year of FY 2005 is not complete for all facilities and % Chg from Base Year for those facilities reflects the first complete 12 month of data after Oct 2004.

## **STATE OF ALABAMA - AGENCY REPORTS**

### **Alabama Department of Corrections (ADOC)**

- Initiated two energy performance contracts totaling over \$77 million that entailed the installation of over 480 energy conservation measures at 34 ADOC facilities statewide. The measures include lighting upgrades, personal computer power management, programmable thermostats, occupancy sensors, ozone laundry systems, and centrally-controlled energy management systems. The ADECA - Energy Division awarded \$20,965,000 from the American Recovery and Reinvestment Act federal funds to be applied toward this project. During FY 2012, they saved \$1,571,222 in annual energy costs.
- State-level utility auditing services contracted with Ingenuity Inc. to achieve savings more associated with dollars than BTU's. Since the contracts inception in 2007, the Department has realized savings exceeding \$3.3 million dollars. The savings have come largely from reductions in the natural gas transportation charges associated with competitive fuel clause filings with the Public Service Commission, the correction of utility billing errors, and use of more advantageous electricity rates per Ingenuity's recommendations.

### **Alabama Emergency Management Agency**

- The Alabama Emergency Management Agency added a new 12,000 square foot facility built to High Performance Building Standards that was occupied in FY 2008. The original 23,000 square foot facility was upgraded using an Energy Savings Performance Contract.
- Heating, Ventilation and Air Conditioning (HVAC) improvements, lighting and energy management controls were included. The renovated building has reduced energy consumption by 48.6 percent since FY 2005. The new facility has reduced energy consumption by 22.1 percent since constructed in FY 2008. During FY 2012, they saved \$79,848 in annual energy costs.

### **Alabama Department of Environmental Management**

- The Alabama Department of Environmental Management continues to enforce the Department's Energy Conservation Memorandum, which was signed June 27, 2008. Additionally, improvements were completed to the Central Laboratory, including exhaust heat recovery, chiller desuperheater, and other components that have greatly reduced the energy consumption at the Department's single largest consumer of electricity.
- Low-cost/no-cost measures implemented include occupancy sensors, timers on HVAC and water heaters, prohibition on personal appliances in offices and enforced temperature settings. During FY 2012, they saved \$187,063 in annual energy costs.

### **Alabama Department of Finance**

- The Alabama Department of Finance implemented low-cost/no-cost measures and conducted general audits toward achieving the goal of Executive Order 25.
- Lurleen B. Wallace Office Building: A \$175,000 project to upgrade the building's HVAC control system was completed at the beginning of FY 2012. The building's energy consumption dropped 20.9 percent from FY 2011 to FY 2012, and energy costs were reduced by \$53,800. From FY 2005 through FY 2012, the building's energy consumption dropped 22.5 percent.

### **Alabama Forestry Commission**

- In Fiscal Year 2005, the Alabama Forestry Commission adopted a self-administered policy to lower utility use at its main office in Montgomery through a number of methods including requiring employees to turn out lights when out of the office, decreasing wattage in light bulbs and applying film strips on windows. Over the years as funding allowed, other cost-saving measures were implemented. The result is a 36.2 percent reduction in energy use from the time the program began in 2005 through 2011. Major HVAC improvements previously deferred were necessary during FY 2012. Temporary chillers were required as a new system was installed. With the extra load, the savings were reduced to 28.1 percent since FY 2005. They have closed six county offices in the state which will reduce overall consumption and utility costs. During FY 2012, they saved \$19,290 in annual costs.
- Low-cost/no-cost measures were implemented that provided the capability of turning off offices equipment at the end of each work day. An employee was assigned with turning off lights in all common areas at 5:00 PM. The number of fluorescent bulbs was reduced, and light fixtures were converted to T8 as they failed. Due to major budget reductions, they were unable to complete a lighting upgrade from T12 to T8 lighting, but will continue to upgrade fixtures as they fail. 861 square feet of window film was installed on all 2<sup>nd</sup> floor windows which rejects 77 percent of solar energy, and has reduced the heating and cooling load on the systems.

### **Geological Survey of Alabama/State Oil & Gas Board**

- There was no valid data from 2005 due to accounting, billing and metering changes. Based on an estimated baseline, currently adjusted energy use for the main building is showing a 14.5 percent decrease. The secondary building has energy consumption based on an arbitrary share of total building usage, of which 3/4 is that of The University of Alabama, and that usage has increased.
- Additional savings in the main building will result from replacement of lighting installed during the renovation of two conference rooms and the replacement of three fan coil units

with more energy-efficient and thermostatically controlled ones. During FY 2012, \$6,984 was saved in energy costs.

- Low-cost/no-cost measures included the use of compact fluorescent lighting, occupancy sensors and urging personnel to make use of window blinds during summer months to curtail solar gain and reminding staff to turn lights/computers off when offices are vacant. Energy-efficient models are chosen when purchasing replacement computer monitors. Monitoring of lighting is conducted during building lock-up.

### **Military Department**

- To reduce energy consumption in the short term, a four - 10 hour day workweek was implemented statewide for all personnel in the National Guard. HVAC systems are controlled by Building Automation Systems, and programmable thermostats were installed at certain sites as needed. Other mitigation measures included removing personal heaters, consolidating armory kitchens and adjusting domestic water heaters. Facility energy personnel will be assigned at sites to assist in ensuring that lights and other devices including HVAC are properly turned off.
- Low-cost/no-cost measures included identifying sites that will qualify for a lower rate; appointing facility managers to help ensure that lights and HVAC systems are turned off and implementing lighting upgrades that have a high savings to investment ratio.
- Several new buildings have been completed with extensive use of geothermal and photovoltaic systems. All buildings currently under design will meet or exceed ASHRAE 90.1.
- An energy reduction of 23.3 percent was realized by the state portion of the National Guard for the current FY 2012 when compared with the base year of FY 2005, resulting in \$380,209 annual costs savings. Conversely the cost of energy per square foot has increased by 19.8 percent as a result of higher prices in electricity and gas. To mitigate the price increases, Alabama Power Company reviewed rates for the National Guard. In support of this effort, 15 sites have been identified that qualify for the contract term discount (CTD) rate with an estimated savings over a five year period is approximately \$56,000 per year.

### **Alabama Board of Pardons and Paroles**

- The Alabama Board of Pardons and Paroles completed an energy audit in FY 2009, but did not implement recommendations due to complications involving financing the project.
- Ingenuity, Inc. reviewed utility rates and obtained a rate reduction with Alabama Power for the Transition Center facilities.



- Energy conservation measures initiated were installing energy-efficient lighting, water savers on shower heads, cleaning all air conditioning coils, repairing water leaks and reducing water consumption in toilets and other low-cost/no-cost measures.
- The annual energy savings for FY 2012 was \$3,769.

### **Postsecondary Education**

- Postsecondary has involved all of the Alabama Community College System (ACCS) in efforts to achieve the goals of EO 25. Each institution has appointed an Energy Officer for implementation and administration of the respective institution's online Portfolio Manager Program.
- For the 2012 fiscal year reporting period, ACCS has 5,204,095 gross square feet of floor space and \$8,633,581 in annual utilities posted in the Portfolio Manager Program. Data for the benchmark 2005 fiscal year was not available for all agencies; however, most institutions have input at least three years of data. The current FY 2012, costs saved for ACCS is \$754,884. ACCS institutions anticipate improved reporting results as more data is available for analysis. ACCS has initiated an energy efficiency work group to develop a formal energy plan for the system.

### **Alabama Department of Public Health**

- Alabama Department of Public Health (ADPH) is committed to achieving the goal of EO 25, and has been working diligently to collect data to assess energy usage in their buildings across the state. Multiple utility providers, inaccessibility of historical data, and the unavailability of electronic data from a number of utility companies have made the data collection difficult.
- ADPH is in the developmental phase of an Employee Energy Awareness Program. ADPH's plans include the integration of energy awareness suggestions into existing departmental publications and communication systems, at little or no cost to the Department. Written directives were issued to staff regarding keeping room lights and computer monitors turned off when not in use. Portable electric space heaters are prohibited in the Central Office. Low cost measures such as programmable thermostats, light sensors, and defined temperature settings have been implemented in many ADPH facilities. ADPH buildings are monitored quarterly for HVAC filter changes as part of an on-going building maintenance program. More expensive measures such as intensive energy audits have been performed in a small number of facilities that have exhibited extreme energy usage.
- Savings are difficult to determine, since the utilities are paid by the Retirement Systems of Alabama for the entire building, and ADPH offices comprise a portion of the building.

### **Alabama Real Estate Commission**

- The Alabama Real Estate Commission has not undertaken any new activities or measures for energy reduction since October 2011. The Commission continues to utilize all low-cost/no-cost energy-saving measures that were implemented prior to Fiscal Year 2012. The energy policy has been incorporated into the Commission's policies and procedures manual as a reminder to existing and incoming personnel of the agency's commitment to energy conservation.

### **Alabama Department of Transportation**

- The Alabama Department of Transportation (ALDOT) has been unable to retrieve data from 2005 and 2006 for many of the divisions. Therefore, the Base Year varies from division to division. Overall, they have not seen a sustained energy reduction.
- The ALDOT has encouraged all divisions and districts to take whatever steps deemed necessary to conserve energy and cut costs. It has been suggested that all T12 bulbs be replaced with the more energy-efficient T8 bulbs. Older boilers and generators that are in need of replacement are being replaced with new energy conserving models. The actual savings from making these changes may not be apparent for at least another year.

### **Athens State University**

- Energy usage is down 19.6 percent since 2005. All renovations in the last few years have incorporated the energy requirements of the Alabama Building Commission.
- \$33,064 in annual energy costs was saved during FY 2012
- Education of employees about energy conservation
- Monthly tracking of facility energy usage and analyzed energy usage
- Retrofitting of lighting and plumbing fixtures made as scheduled
- Added insulation, caulking, etc., where needed
- Continuously monitoring HVAC usage through programmable controls
- Promote energy conservation and low-cost/no-cost measures
- Use light switch covers to encourage turning off lights
- Change lighting from T12 to T8 bulbs, incandescent to CFLs, and some to LEDs
- Monitor and maintain HVAC units for optimum efficiency continuously

## **University of Montevallo**

- In 2005, the University of Montevallo was nearing the end of a Performance Contract with Trane. That ten year contract consisted of installing a campus wide building automation system and various upgrades to HVAC equipment. It generated energy savings of \$3,831,407.
- In 2009, the University began a second phase involving an expansion of the campus chilled water loop and upgrades to the Central Plant. The primary chiller was replaced with a high efficiency variable speed model and variable frequency drives were installed on pumps and air handlers in several buildings on campus. Also, the main campus boiler was replaced with new high efficiency steam generators. This project also resulted in significant energy conservation.
- Additionally, the University made a campus wide switch to more efficient lighting over the past several years. Over the past year efforts continued to focus on cutting energy use wherever possible.
- Between Fiscal Year 2005 and 2012, the University has reduced its Energy Intensity by over 20 percent. During FY 2012, \$252,846 was saved in energy costs.

## **Trainings & Recommended Low-cost/No-cost Energy Conservation Measures**

The ADECA - Energy Division provided technical assistance and training to state departments and agencies. Through workshops, webinars and conferences, the Energy Officers were trained in no cost energy efficiency practices, Portfolio Manager Data maintenance and reporting, as well as Commercial Building Auditing. The Energy Officers were also trained in utility invoice analysis and how to review and verify that energy bills are correct and billed at the most advantageous rate for which the agency/facility is entitled. Representatives from 25 state agencies, departments and institutions have attended the seven workshops.

<b>2012 Training Workshops:</b>	January 30	State Energy Efficiency Workshop
	February 15 & 16	Postsecondary Education Facilities Workshop
	May 15	Involving People in Energy Savings, Lighting, Motors and Compressed Air Systems
	May 16	Commercial Building Audit Class
	August 23	Energy Efficiency - "Energy training for State Energy Officers"
	August 23	Energy Efficiency - "Best Practices for Energy Savings"
	September 27	EO 25 Annual Reports/Energy Direct Energy Officer Training

<b>Recommended Low-cost/No-cost Energy Conservation Measures</b>	<ul style="list-style-type: none"> <li>• Ensure energy use reduction during peak demand periods to both save energy and costs</li> <li>• Review and verify that energy bills are correct and billed at the most advantageous rate for which the agency/facility/department is entitled</li> <li>• Ensuring lighting systems are turned off during non-operating hours</li> <li>• Conversion to more energy-efficient lighting systems and bulbs as existing systems and bulbs reach the end of their life cycles</li> <li>• Maximize use of natural lighting consistent with temperature control</li> <li>• Replacement of conventional light switches with motion-sensor switches</li> <li>• Replacement of incandescent lights in exit signs with LED fixtures</li> <li>• Removal or reduction of all other non-essential lighting</li> <li>• Setting standards/ensuring HVAC systems operate at appropriate levels at all times, to include reduced levels during non-operating hours</li> <li>• Use of Building Automation System (BAS) and Automated Temperature Control (ATC) systems. Set operating schedules to coincide with work day/work week</li> <li>• Ensuring preventive maintenance of HVAC systems to include cleaning/filter replacement</li> <li>• Ensuring all equipment powered by electricity is turned off when not in use</li> <li>• Temperature reduction for hot water heaters in all facilities except where operational needs require a specific water temperature</li> <li>• Prohibition of personal space heaters except in areas where central HVAC systems cannot provide adequate heat under objective standards</li> <li>• Improved insulation of windows, doors, walls, roofs, floors, and sealing of ductwork</li> <li>• Ensuring employees are educated/trained in energy conservation methods as applicable to their duties and responsibilities</li> </ul>
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## **Findings/Recommendations**

1. All agencies and departments are not using EPA's ENERGY STAR Portfolio Manager.

**Recommendation:** Governor's Office should reiterate the Portfolio Manager requirement. The defined baseline year FY 2005 was not used by all agencies as utility data was not readily available. Facilities in use during 2005 must have data entered for all of FY 2005. New facilities will have a baseline of the year the facility was in use by the agency.

Continue to assist agencies with input of at least Base Year and two years current data. The ADECA-Energy Division will continue to contact utility providers for prior year data and work with utility providers to improve and provide electronic utility data to agencies on a timely basis. Agencies continue to struggle to obtain their energy use data and some utility providers are not supporting efforts to retrieve data.

2. Agencies did not notify the ADECA - Energy Division of changes in assignment of Energy Officers.

**Recommendation:** Alternate Energy Officers should be identified and trained. Agencies must ensure that those responsible for performing the data entry attend the training.

3. Several progress reports were not submitted to the ADECA - Energy Division within 30 days of the end of the Fiscal Year as ordered. If Agencies fail to report to ADECA, there is no recourse.

**Recommendation:** Establish a web-based module for Energy Performance Report Data. Agencies would report their performance data directly into the database on a quarterly basis. This would allow the Energy Division to monitor and assess their performance throughout the year. A rating system for measuring progress would also be integrated into the database.

4. Incomplete data falsely presents an Agency as having met the reduction goals, while in reality it is simply missing data.

**Recommendation:** The reported data will be validated and improved each quarter. This may also affect the baseline. Additional Base Year data is being requested from all utility providers to meet the mandate in the Executive Order. Agencies should conduct an internal review quarterly and update Base Year or acquire data for specified Base Year.

5. Develop a resource plan for financing energy improvements.

**Recommendation:** Develop an incentive program for successful agencies. There were no incentives nor were there consequences for not meeting the goals of EO 25. It would be beneficial for the savings generated from energy reductions, rate changes and refunds to be invested in energy efficiency equipment or Retro-commissioning in order to turn dollar savings into long term energy savings. The amount reported saved on the Statewide Ingenuity Contract for Utility Bill Analysis from 2007 through July 2012 was \$8,824,714 for all agencies.

## **Acronyms & Definitions**

ASHRAE	American Society of Heating, Refrigeration & Air-Conditioning Engineers
BAS	Building Automation System
FY 2005 Base Year	The selection of FY 2005 as the Base Year was established on U.S. Environmental Protection Agency documents for energy reduction opportunities in buildings and established standards for benchmarking energy performance.
Benchmarking	Benchmarking involves measuring and rating a building by comparing it to a standard. Some owners and managers collect energy data for their entire portfolio of buildings, calculate the Energy Use Intensity (EUI), which is energy consumed per square foot, and then choose a baseline as the year with the highest consumption.
BTAL	Business Time Advantage - Large
BTU	British Thermal Unit (a common unit of measure for natural gas use and heat output)
CTD	Contract Term Discount
DDC	Direct Digital Control
ECI	Energy Cost Index - a unit of measurement that describes a building's energy cost as dollar cost per square foot.
ECM	Energy Conservation Measure
Energy Efficiency	Energy Efficiency is defined as using less energy to provide the same level of energy service.
Energy Performance Contracting	Energy Performance Contracting is offered by Energy Service Companies as a practical and economical way for public sector entities to obtain and finance needed capital energy projects for their facilities. Essentially, it is the acquisition of comprehensive energy improvements and services provided by qualified Energy Service Companies where the energy and cost savings achieved by the installed energy project are guaranteed and cover all project costs, including financing, over a specified contract term.
Energy Reduction	Energy Reduction is defined as the change in a building's Energy Use Intensity (EUI) for two periods.

ENERGY STAR Portfolio Manager	ENERGY STAR Portfolio Manager allows you to track energy and water use trends as compared with the costs of these resources. It allows you to compare costs savings across buildings and shows the calculated cost savings for a specific project. Portfolio Manager will generate a Statement of Energy Performance for each building summarizing energy information and building characteristics such as site and source intensity.
EUI	Energy Use Intensity - a unit of measurement that describes a building energy use. EUI represents the energy consumed by a building relative to its size and values are presented in kBtu/ft <sup>2</sup> .
GPM	Gallons per Minute
HVAC	Heating, Ventilation and Air Conditioning
kBtu	One thousand BTUs
LPL	Light Power Service - Large
LPLE	Restricted Light and Power Service - Large
LPTL	Light and Power - Time of Use - Large
ML	Multiple Load
MMBtu	One million BTUs
Retrocommissioning	Retrocommissioning is a systematic and documented process for identifying low-cost/no-cost improvements that can boost the efficiency and performance of an existing building.